THE MARS PATHFINDER SCIENCE DATA PROCESSING SYSTEM

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An integrated data processing system was used to support the science payload instruments on Mars Pathfinder that was developed and operated at very low cost through introduction of new technology. The system provided level O processing of all payload data (from the Imager for Mars Pathfinder, the rover camera systems, the Alpha-Proton X-Ray Spectrometer, and the Meteorology experiment) in real time as the telemetry was received on the ground, The system also supported mission critical activities by performing rapid higher level processing of selected data. Computer generated mosaics, including stereo mosaics, were produced within minutes of data receipt on the ground to support rover deployment and navigation requirements. Color mosaics were produced rapidly to meet press release and science planning deadlines. An integrated data base management system provided science team access to data within seconds following completion of construction of science data records. The same data management system supported requirements of operations personnel, press access to released data in various formats, transfer of data rapidly to the world wide web for public access, query and retrieval requirements of science team members located at JPL or at their home facilities around the world, and preparation of final archival products for submittal to the Planetary Data System.

A variety of high level data products was generated on operational support time cycles through the use of new technology. High Definition TV was used for the first time in a planetary mission to support science analysis and operational decision-making. Stereo HDTV was used to provide context for science analysis and operational decisions. Large format hard copy prints, up to 15 feet in length, were generated using newly available commercial large format printers. Anaglyphs were produced and disseminated on the world wide web for public viewing of stereo imagery. The Virtual Reality Modelling Language (VRML) was used for the first time on a flight project to provide the ability to interactively roam across three dimensional views of the landing site on home computers and on workstations in the science team areas.

This paper will describe the system developed to support Mars Pathfinder, the technology that was used to provide sophisticated products at very low cost, and the variety of data products used to support Mars Pathfinder operations. This paper represents one phase of work performed at the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.